

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested. Claims 1-29 are pending, Claims 1, 8, 16, and 28 having been amended by way of the present amendment.

In the outstanding Office Action Claims 1-3, 8, 12, 16, 20, 21, 28 and 29 were rejected as being unpatentable over Ishikawa et al. (U.S. Patent No. 5,862,264) in view of Fu et al. (U.S. Patent No. 5,703,965) and Fan (U.S. Patent No. 5,495,538); Claims 4-6, 15, 25 and 26 were rejected as being unpatentable over Ishikawa et al. in view of Fu et al., Fan and Murakami et al. (U.S. Reissue Patent No 35,414); Claims 7 and 27 were rejected as being unpatentable over Ishikawa et al., Fu et al., Fan, Murakami et al. and in further view of Webb et al. (U.S. Patent No. 6,621,909); Claims 9, 10, 17 and 18 were rejected as being unpatentable over Ishikawa et al. in view of Fu et al., Fan and in further view of Su (U.S. Patent No. 4,162,482); Claims 11 and 19 were rejected as being unpatentable over Ishikawa et al. in view of Fu et al., Fan, Su and in further view of Lee et al. (U.S. Patent No. 5,612,744); Claims 13, 22, and 24 were rejected as being unpatentable over Ishikawa et al., Fu et al., Fan and in further view of Acharya et al. (U.S. Patent No. 6,229,578); and Claims 14 and 23 were rejected as being unpatentable over Ishikawa et al. in view of Fu et al., Fan, Acharya et al. and in further view of Futamura (U.S. Patent No. 5,791,271).

In reply, each of the independent claims has been amended to refer to the extraction of edge information which is binary information representing an edge part of the original image, and smoothing the edge part using the edge information. Support for the amendment to the claims is found at least at page 23, lines 13-14 in the present specification.

Amended Claim 1 includes steps of extracting edge information which is binary information representing an edge part of the original image. The method also includes the step of obtaining density information of an edge smoothed image from said original image by

smoothing said edge part using said edge information. According to amended Claim 1, the edge information, which is binary information is extracted, and then density information of an edge smoothed image is obtained using the edge information. Then, encoding is performed. During decoding, each of the edge information and the density information of the edge smoothed image is obtained by decoding, and the edge part of the edge smoothed image is sharpened by using the edge information.

In contrast, the primary reference of Ishikawa et al. is directed to obtaining a smoothed image (see, e.g., step 11 of Figure 1) and then an edge image is obtained by subtracting the smoothed image from the original image (see e.g., step 14, and the edge image GE). After the edge image is obtained, coding is performed. During image decoding, the edge image and the smoothed image are combined to output a restored image (see e.g., step 23 of Figure 1).

Comparing amended Claim 1 with Ishikawa et al., amended Claim 1 requires that the edge information be binary information. An advantage with this approach is that the information amount can be small so the data can easily be transmitted through the network. In contrast, in Ishikawa et al. since the “edge image” is an image obtained by subtracting the smoothed image from the original image, the “edge image” includes many pixel values indicating edge parts and smoothed parts (see Figures 8a-8c in Ishikawa). Consequently, in Ishikawa et al., the encoding and transmitting of the “edge image” gives rise to problems such as those described in pages 1-3 of the present specification for transmitting a general image. Furthermore, coding and efficiency is poor for encoding the “edge image” obtained by subtracting the smoothed image from the original image so the information amount is large and therefore a large network bandwidth is required for transmitting the “edge image”.

None of the references cure what is deficient in Ishikawa et al., namely the failure to describe “extracting edge information which is binary information representing an edge part


of the original image”, and obtaining density image of an edge smoothed image from said original image by smoothing said edge part using said edge information”. Neither Ishikawa et al. nor the ancillary references teach or suggest “obtaining said reproduced image from said density information of said edge smoothed image by sharpening said edge part of said edge smoothed image by using said edge information (which is binary information)”.

Although perhaps of different statutory class, and/or scope, each of the other pending Claims 2-29, as amended, patentably defines over Ishikawa et al. in view of the ancillary references, for substantially the same reasons as discussed above with regard to amended Claim 1.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1-29, as amended, is patentably distinguishing over the prior art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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